

Report on Network Simulator 2 (NS2) Offline

Wireless MAC 802.11 Protocol

The IEEE 802.11 MAC protocol is the standard for wireless LANs. **This protocol works in layer-1 and layer-2 of the OSI reference model.** The protocol provides two types of services:

1. Basic Service Set (BSS)
2. Extended Service Set (ESS)

There are several components that comprise the architecture of this protocol:

1. station (mobilenode)
2. access point (stations are connected to access point in a BSS)
3. BSS (stations and access points within same radio coverage)
4. ESS (several BSSs connected through access points)
5. Portal (bridges to other wired networks)
6. Distribution system (logical interconnection network based on several BSSs)

The wireless MAC 802.11 protocol, as a wifi technology, is widely used in testbeds and simulations for wireless multihop ad hoc networks.

Destination Sequenced Distance Vector Routing (DSDV)

The Destination Sequenced Distance Vector routing or DSDV is a routing protocol for ad hoc networks. **This protocol works in layer-3 of the OSI reference model.** The protocol is table-driven and proactive based on a routing information update mechanism. It is basically an enhanced version of Bellman-Ford's SSSP algorithm. There are several features associated with the protocol:

1. each node maintains shortest paths to other destination nodes
2. It incorporates table updates with increasing sequence number tags which results in:
 - a. preventing loops
 - b. countering the count-to-infinity problem
 - c. faster convergence
3. neighboring nodes exchange routing tables at regular time interval
4. tables are updated in two ways:
 - a. incremental update
 - b. full dumps update

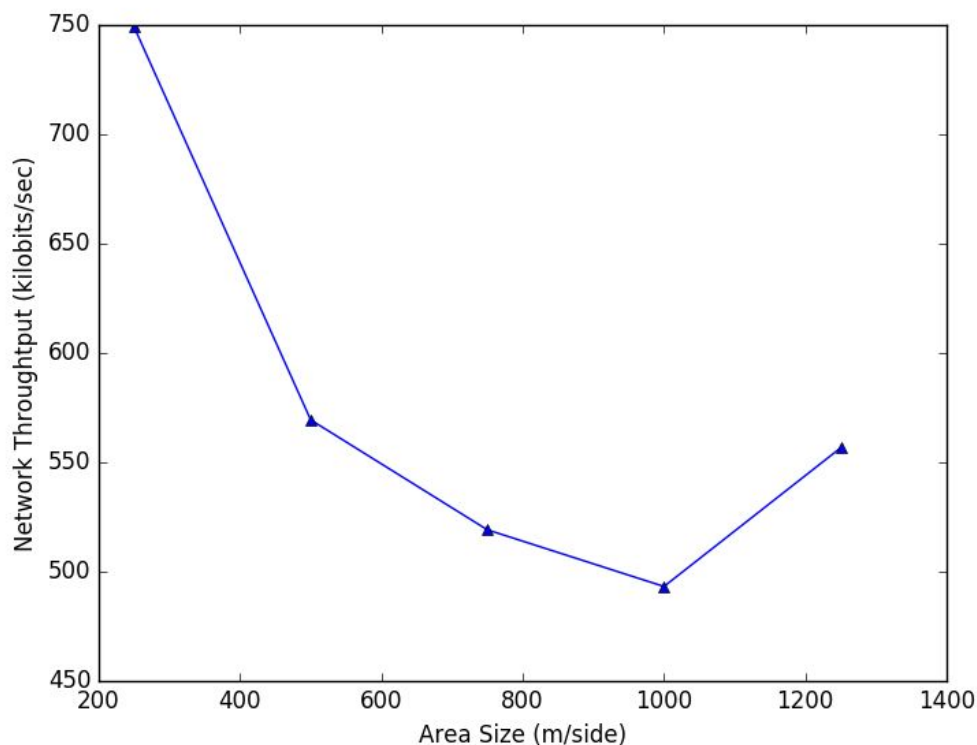
User Datagram Protocol (UDP)

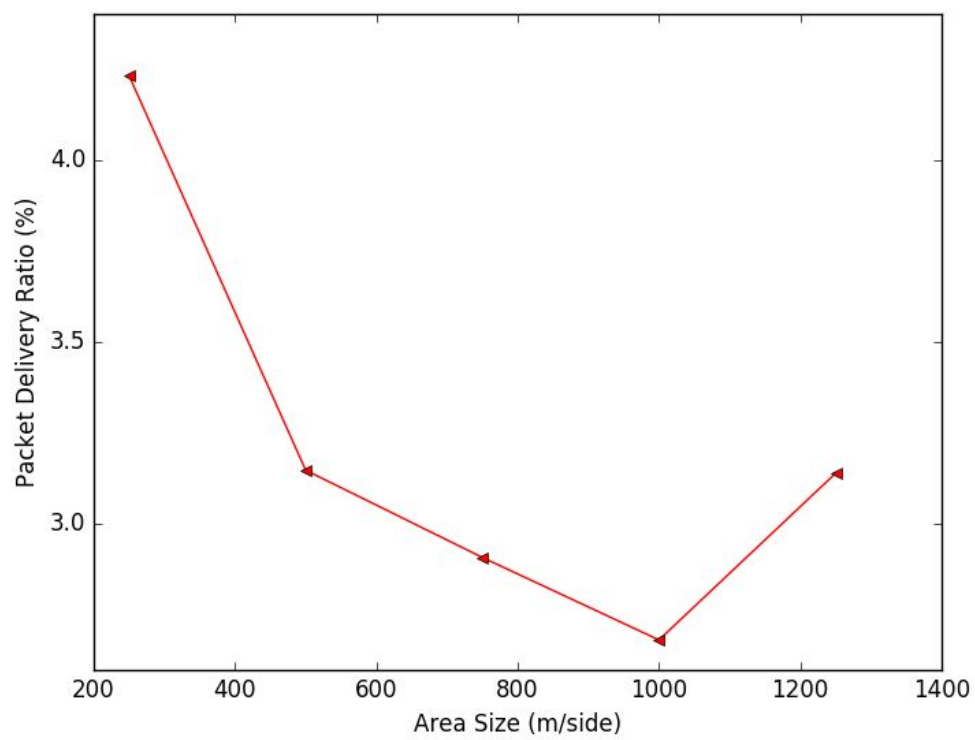
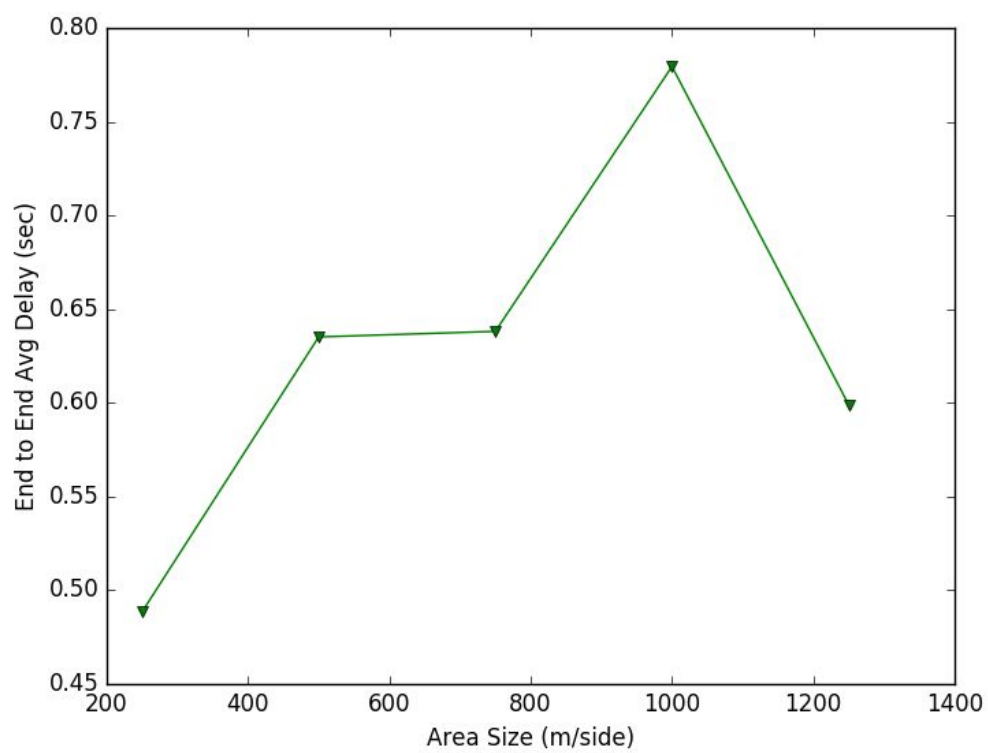
User Datagram Protocol or UDP is a connectionless and unreliable protocol. **This protocol works in layer-4 of the OSI reference model.** The protocol has very limited cross checking capability. It is a good protocol for data flowing in one direction. It is simple and suitable for query based communication. Therefore, UDP can be used when a process needs to send a small message without any reliability issue. It is a very simple protocol and it can be used with minimum overhead. UDP takes less time as compared to other layer-4 protocols like TCP (Transmission Control Protocol) or SCTP (Stream Control Transmission Protocol).

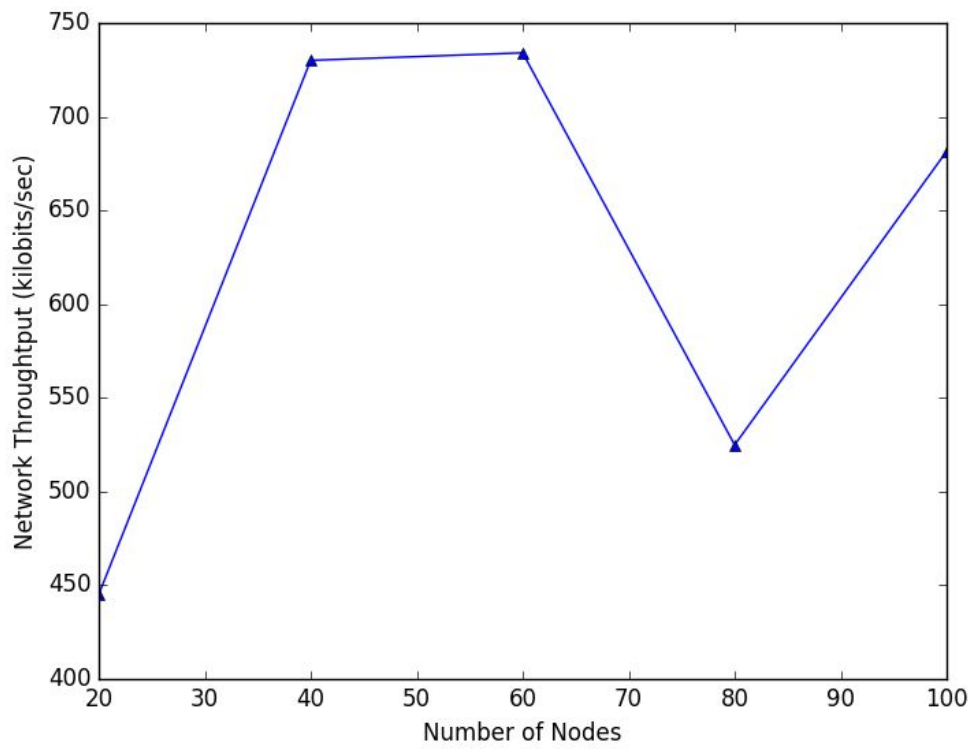
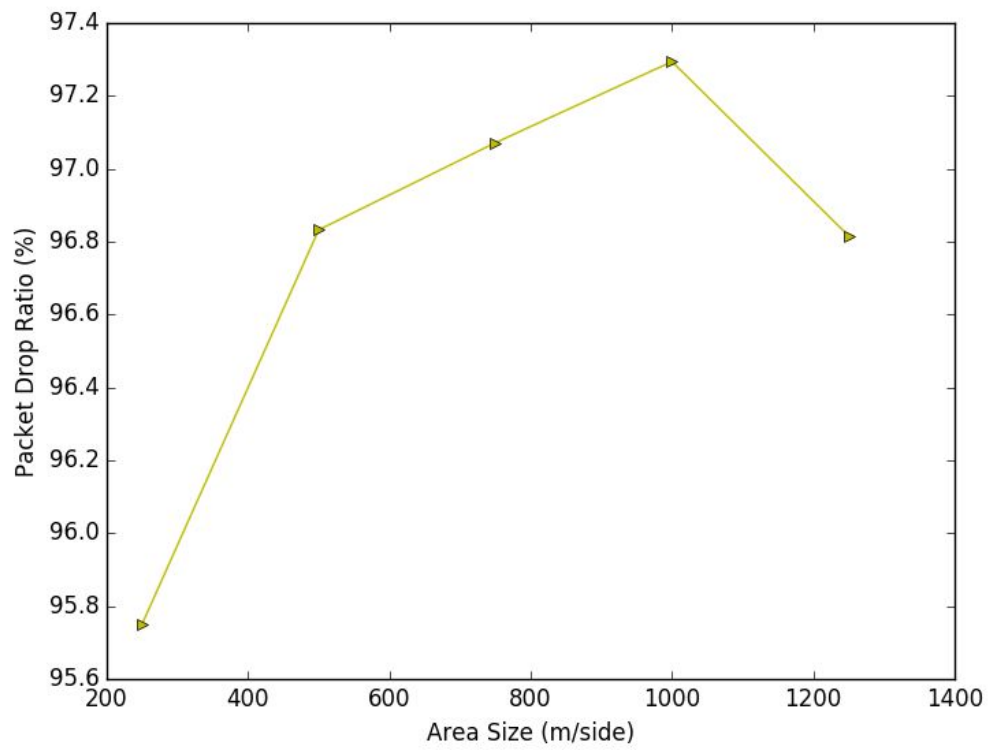
Constant Bit Rate Traffic (CBR Traffic)

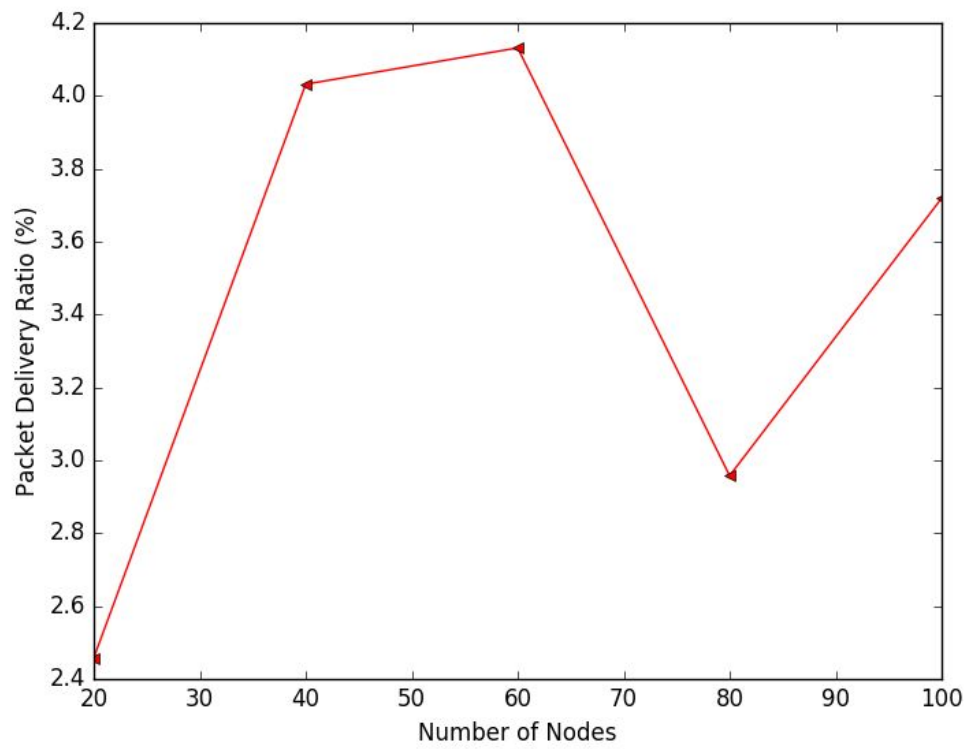
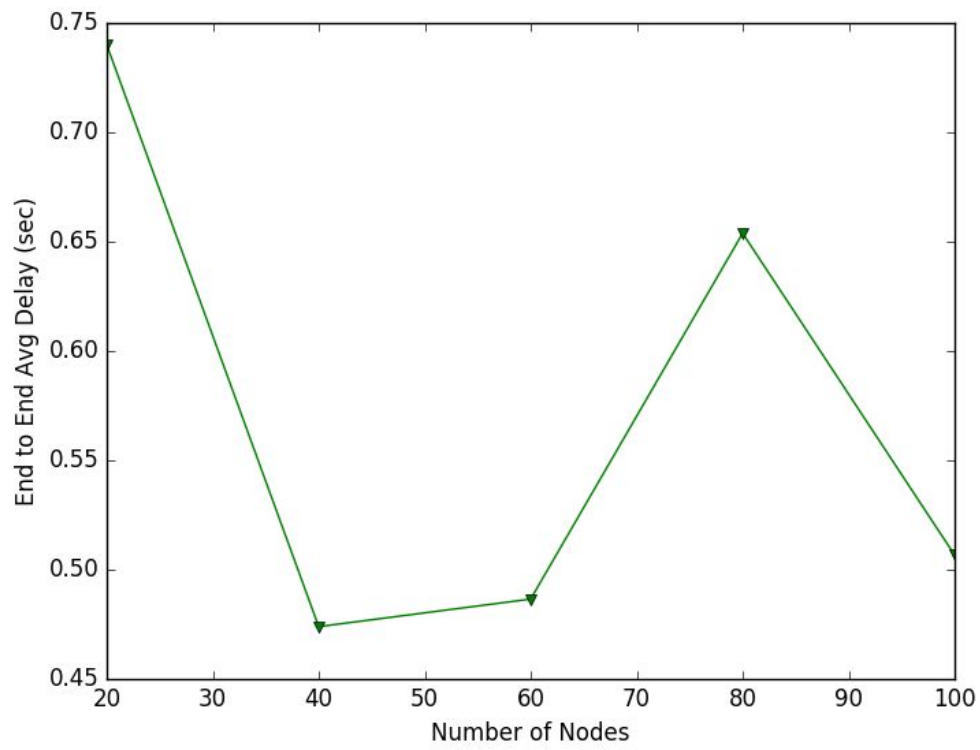
The Constant Bit Rate or CBR service category is used for connections that transport traffic at a constant bit rate, where there is an inherent reliance on time synchronisation between the traffic source and destination. **This service category works in layer-7 of the OSI reference model.** The CBR is tailored for any type of data for which the end-systems require predictable response time and a static amount of bandwidth continuously available for the life-time of the connection.

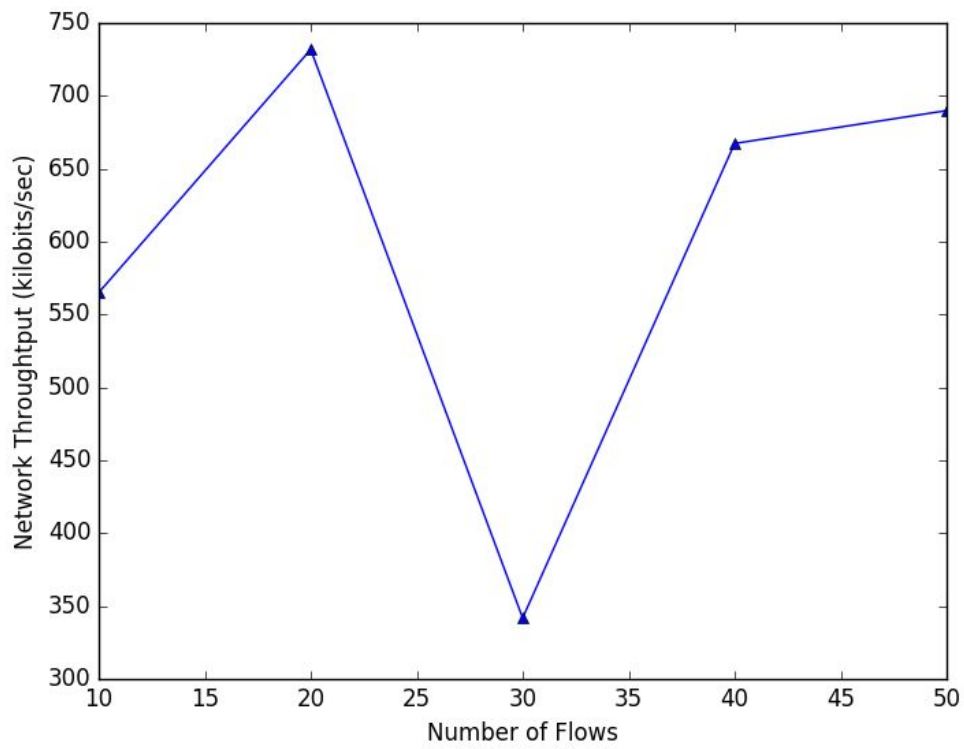
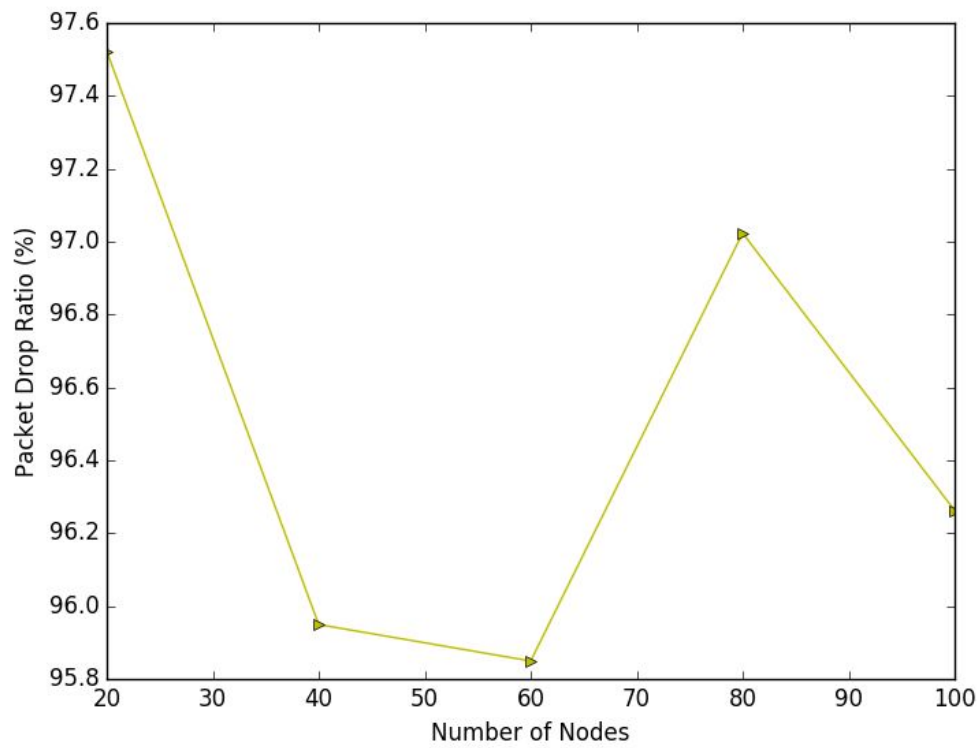
Graphs

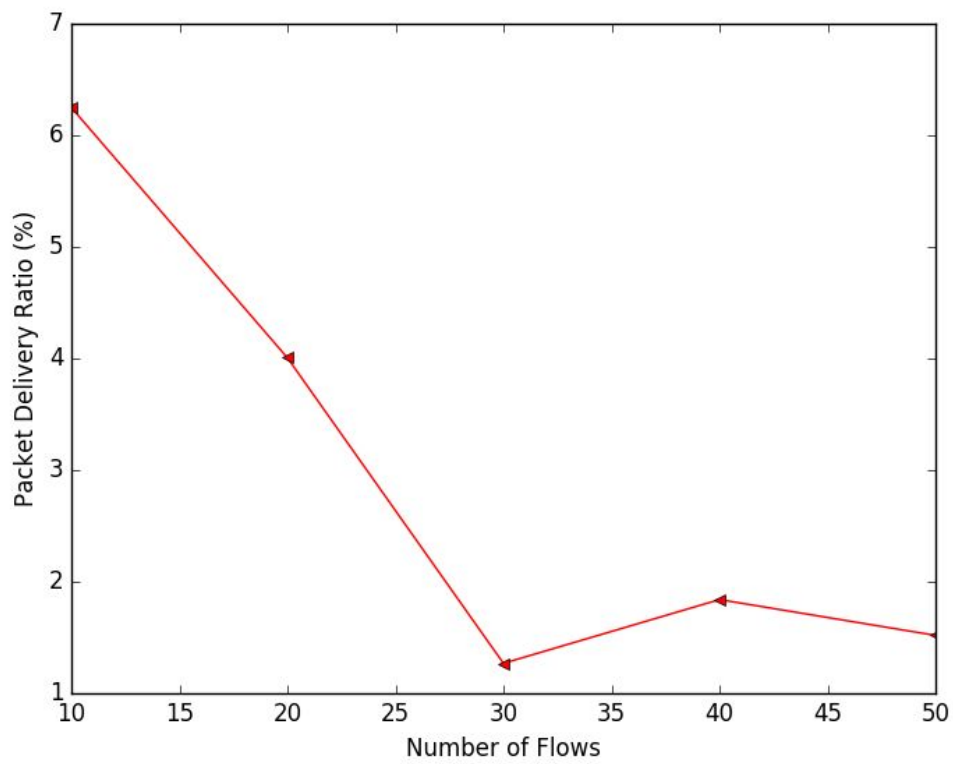
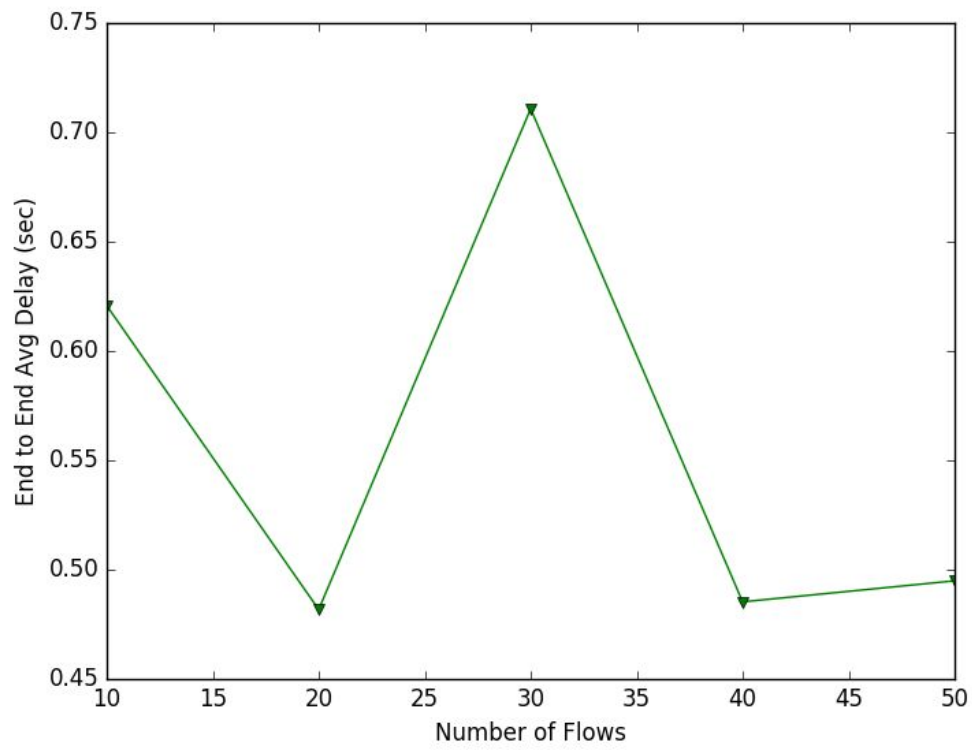


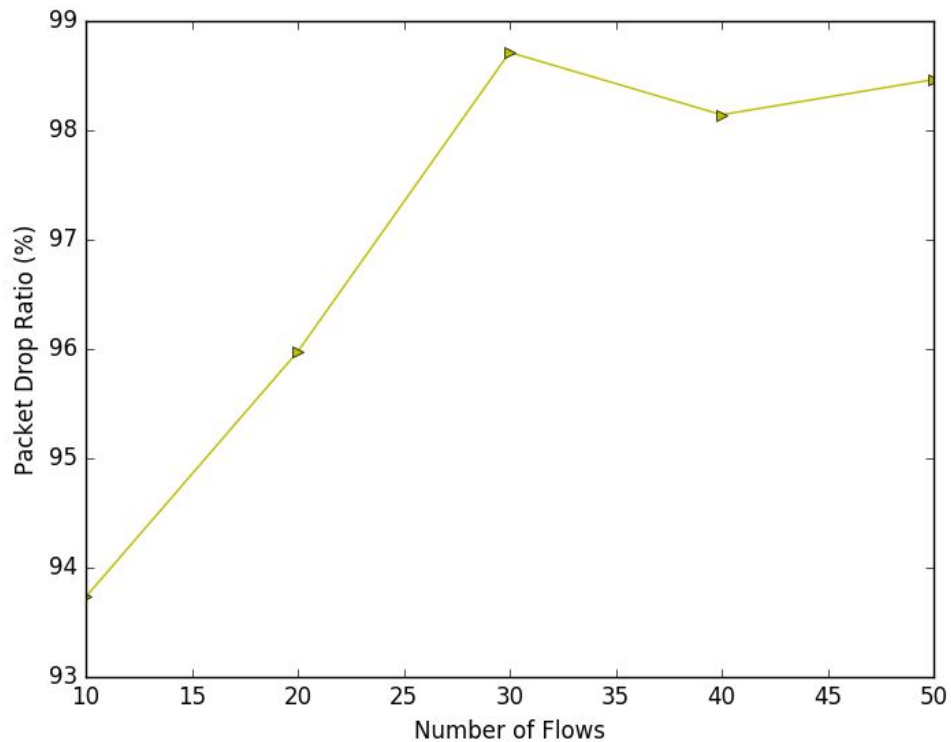












Observations

Several observations on the results are noteworthy:

1. network having lower throughput tends to have higher end-to-end average delay for packet transmission
2. UDP is unreliable as there is no acknowledgement sent from receiving end in response to a data packet
3. some packets get lost in the network
4. random placement and movement of nodes result in irregularity in packet transmission
5. amount of packet drop is significantly higher than amount of packet received
6. fewer number of flows in the network improves packet delivery ratio.

Overall, these points spotlight the characteristics of provided network topology.